INTERACTIVE PATIENT-PROVIDER DATA SYSTEM AND METHOD

Field of the Invention

The invention relates to methods and systems uniquely designed for and utilized in the practice, administration, or management of a health care provider practice, including billing, and patient medical records and management of records of diagnosis or treatment Also included are methods and systems for patient interaction.

Background of the Invention

Productivity growth is the key ingredient for a low inflation, growing economy. The service industries are the most refractory to productivity gains. And, within the service sector, the health care industry has been the most difficult area in which to increase productivity.

A need exists to automate and enhance the information exchange between the patient and the provider. This would facilitate a more efficient utilization of the provider's time and the patient's time, while reducing the possibility of errors.

Summary of the Invention

The invention relates to a method and system for collecting, managing and delivering patient data, as needed, as scheduled, or as requested, to the patient, and to providers.

One aspect of the invention is a method of presenting patient data to a requestor. The requester and recipient can be one and the same; in most cases the requester/recipient is a patient, but sometimes it is a provider. This includes the steps of querying at least one data base for patient - specific data, and determining the access status of the requestor. The method next includes selecting records that satisfy the query and are visible to a selected recipient, and presenting the data to the recipient from one or more selected data fields, and frequently hundreds of data fields, in accordance with one or more, and frequently hundreds of applets, objects, or templates.

The method can be and frequently is web based, with the requestor requesting patient data from a browser through a web server, or the recipient receiving the data through a web server on a web browser. The system presents the selected data fields with one or more objects or templates in a form chosen from among clinical records, treatment records, diagnoses, treatment plans, appointment reminders, recalls, bills, payment overdue reminders, no shows, greetings, prescriptions, referrals, and referral reports. The patient data may include interactions with third party payers, payment information, copayment and deductible information, and aggregation of payments, copayments, and deductibles, especially in the context of family billing. A further aspect of the invention is a patient relationship management capability managed by the method and system of the invention.

The data is presented to the recipient in electronic or hard copy form, and the requestor is typically a patient and the recipient is also typically a patient.

A further aspect of the invention is determining the access status of a requestor or source by matching an identifier and a password to values of the identifier and password (or id and pin) stored in a repository or database. In one scenario, the requestor or source is a patient, and the patient further supplies elements of data in response to queries, these elements are matched against database entries to grant or deny access. The elements matched against database entries include one or more of birthdate, social security number, and identifying numbers. In a still further embodiment, the system can prompt the user for additional data until a match is established.

Patient data may be accessed, on the provider side, through an intranet, a secure internet, a LAN, or a WAN.

In one further embodiment of our invention, the data within the database includes an array of blocks of time set aside for specific procedures, where each of the procedures has a unique scheduling code. Each patient needing an appointment for a procedure also has a scheduling code where the scheduling code for the patient's required procedure corresponds to the

scheduling codes for the procedures to be performed. To schedule a procedure, the patient schedules a block of time for the procedure by selecting a block of time having a scheduling code corresponding to the patient's scheduling code.

A still further aspect of the invention enables a health provider to receive payment on behalf of a patient, post the payment information into patient accounts, track copayments and deductibles for a patient, and bill copayment and deductible balances to a patient. A further aspect of the billing module includes providing an explanation of copayments and deductibles to the patient. A still further embodiment of the invention includes grouping and aggregating deductibles and copayments by patient families, and reporting deductibles and copayments grouped and aggregated by patient families to a family member.

A further aspect of the invention is a system for presenting patient data to a requester. The system uses an application server and connects to a database server and a web server.. The connection between the application server and the database server is via an open database connectivity module (such as ODBC, which is used solely for purposes of ilolustration). To be noted is that the various servers, that is the database server, the application server, and the web server, along with the open database connectivity module, are different software elements, but may reside on the same or different hardware elements.

The patient data may include interactions with third party payers, payment information, copayment and deductible information, and aggregation of payments, copayments, and deductibles, especially in the context of family billing. A further aspect of the invention is a patient relationship management capability managed by the method and system of the invention.

The system is controlled and configured, e.g., by software running on the one or more computers to query at least one data base through the open connectivity module for patient and provider-patient specific data,. The system is next controlled and configured to determine the access status of the requestor, and to select records that satisfy the query and are visible to the requestor. The system then presents data from one or more selected data fields to a recipient in accordance with one or more objects or templates.

The system is configured through software and a web server to both receive requests for patient data over a web browser through a web server, and to deliver data through a web server on a web browser.

A further aspect of the system is tools repository, as a web-based tools repository, which may reside in one or more databases, and that includes objects, forms, templates, and applets. The system is configured to select at least one of the objects, forms, templates, and applets based upon the query and present the selected data fields with the one or more objects, forms, templates, and applets in a form chosen from the group consisting of clinical records, treatment records, diagnoses, treatment plans, appointment times, recall lists, patient payments and charges, insurance payments and charges, greetings, prescriptions, referrals, and referral reports to the recipient. The reports or output may be in hard copy form or in soft copy form.

One aspect of our invention is a method of and system for improving the efficiencies of medical and dental practices through a web integrator and web-based management tools to enable health care providers to make patient information available to their patients online. One way this is accomplished is by enabling patients to connect to their provider's web site and view appointments and detailed patient information from a password-protected screen.

A still further aspect of our invention is a patient-driven system to collect patient information, including by way of illustration and not limitation, patient histories, questions for the provider, and e-mail addresses, without burdening office staff and thereafter send automated, customized e-mail correspondence, as billing reminders and appointment reminders to patients.

A still further aspect of our invention is that the method and system permits interaction with legacy practice management and database management systems so that it extracts information to display to authorized requesters without any new data entry.

In a preferred embodiment, the system resides on a computer associated with the provider, as a computer in the provider's office, and serves to extract relevant data (such as health histories,

health status, appointment and account information) from the provider's legacy practice management software database and upload it to a web server, e.g., on demand, when scheduled, or each night. Patients log onto the provider's web site to access this data. This web-integrated information is made available to patients with a high degree of security, for example, by password-protected screens and browsers, using security and encryption, on unique secure domain web sites.

A further aspect of the invention is linking multiple providers, including providers in different locations or even different organizations, on a secure internet or intranet, a LAN, or a WAN.

The system and method of the invention can use various patient-based data entry systems, such as health history and e-mail address collection systems, and reminders of questions to ask the provider. One can be installed on a terminal accessible to patients in the waiting room, and the other can be accessed from the provider's web site. This enables existing and new patients to enter their health histories, e-mail addresses, and reminders of questions to ask the provider into the system quickly. Another solution encompassed in the method and system of our invention uses the freshly uploaded data from the provider's practice management database to send reminders to all patients with e-mail addresses who have upcoming appointments

The Figures

The invention may be understood by reference to the FIGURES appended hereto.

FIGURE 1 is an illustration of a web connected system of the invention.

FIGURE 2 is an illustration of software and application elements of the system of the invention.

FIGURE 3 is a screen shot of the initialization screen.

FIGURE 4 is a screen shot of an electronic appointment reminder to be sent by the method and system of the invention.

FIGURE 5 is a screen shot of the settings for an overdue payment.

FIGURE 6 is a screen shot of the payment overdue letter sent by the method and system of the invention.

FIGURE 7 is a screen shot of the recall letter sent by the method and system of the invention.

FIGURE 8 is a screen shot of a no-show letter sent by the method and system of the invention.

FIGURE 9 is a screen shot of a Birthday Greetings letter sent by the method and system of the invention.

Detailed Description of the Invention

The method and system described herein enable health care providers to improve the efficiencies and productivities of their medical and dental practices through a web integrator and web-based management tools. These combine to enable health care providers to make patient information, including account information, diagnostic information, treatment information, prescribing information, and referral and referring information available to their patients online.

A further aspect of our invention is a method and system that enables patients to connect to their provider's web site and view this information from a password-protected server on a password protected screen.

In a preferred embodiment, the system resides on a computer associated with the provider, for example, in the provider's office, and serves to extract relevant data from the provider's legacy practice management software database and upload it to a web server, e.g., on demand, when scheduled, or each night. Patients log onto the provider's web site to access this data. This web-

integrated information is made available to patients with a high degree of security, for example, password-protected screens on unique domain web sites.

The system and method of the invention can use various patient based data entry systems, such as e-mail address collection systems. One can be installed on a terminal accessible to patients in the waiting room, and the other can be accessed from the provider's web site. This enables existing and new patients to enter their e-mail addresses in the system quickly. Another solution encompassed in the method and system of our invention uses the freshly uploaded data from the provider's practice management database to send reminders to all patients with e-mail addresses who have upcoming appointments

Another aspect of the invention is a patient-driven method and system to collect patient information including, by way of illustration and not limitation, patient histories, questions to ask the provider, diagnoses, referrals, prescriptions, e-mail addresses, and the like, without burdening office staff, and thereafter send automated, customized e-mail appointment reminders to patients and charts to individual providers. The program operates self-sufficiently, interacting with legacy databases without additional work for the office staff.

In a preferred embodiment of the invention, at least two patient data collection systems: are utilized. One patient data collection system is installed on a terminal accessible to patients, for example, in the waiting room, and one patient data collection system is accessible from the provider's web site. This enables existing and new patients to enter their patient data, as described above, into the system quickly. The web-based e-mail reminder system, as well as data display systems for individual providers, use the freshly uploaded data from the provider's practice management database to send reminders to all patients with e-mail addresses who have upcoming appointments, as well as to provide patient charts and information to individual providers. The outputs, including patient charts, pharmacy charts, referrals, and automated e-mail reminders, with templates, objects, applets, features and options, are customizable thru the web server.

A further aspect of the method and system of the invention is patient and procedure specific on-line and web-based scheduling. In this application certain blocks of time are set-aside for specific procedures, typically related procedures or even the same procedure for several patients, or for procedures of the same duration or sequence of durations. In a further refinement, patients are assigned a "scheduling code" allowing them to schedule themselves only within the parameters doctor's office has made available, including, for example, a smart scheduler that takes into account patient's available days for scheduling module, for matching patients with preferred hygienists, physicians' assistants, and necessary visit length. This can be integrated with a "power blocking" capability to allocate units of time to each provider, assistant, procedure, and anesthesia procedures to increase productivity without double-booking.

A further aspect of the invention described herein is a complete web-based practice management solution, including patient relationship management. The solution integrates the services required for a health care provider's practice, including, by way of illustration and not limitation, tracking, billing, fee-to-ledger posting, scheduling, visit preparation and premedication, recall list function, pharmacies associated to a patient, diagnostics, treatment plans, storing x-rays and digital images, morphing images, performing cephalometric or other biometric tracings or analyses, and surgical outcomes, staff assignment, time clock, patient conversations, clinical records, treatment records, association of lab work with specific patients, automatic posting of other procedures linked to any given procedure, appointment reminders, payment overdue reminders, no shows, greetings, prescriptions, referrals, referral reports, hygiene analysis reporting, patient hygiene, diet, and self-administered medication tracking, and practice barometers reports, financial reports, missed appointment reports, and automatic inventory reduction.

The practice management method and system of the invention, which is preferably a web-based practice management solution, will also manage third party payer interactions and relationships, including interactions with the patients.

For example, the practice management application contains objects to facilitate billing insurance companies electronically, even with a narrative option on insurance claims. Additionally,

especially with properly coded checks, the system will enable posting of third party payments to patient accounts, including posting of payments from bulk checks, and tracking of outstanding insurance claims,. A further aspect of the method and system of the invention is assigning insurance benefits to patient; while submitting insurance as a service to the patient, tracking year-to-date benefits and deductibles for patients.

The method and system of the invention also enables billing patient copayment balances promptly to the patient after posting an insurance payment This also includes explaining insurance plan limitations and insurance plan copayment amounts to patients. A further aspect of copayment management is a provision for aggregating multiple-patient family copayment plans, thereby replacing of separate payment and copayment plans and records and plans for each member of the family.

A further aspect of the method and system of the invention is data extraction and manipulation, by third party payer, to evaluate individual plans, preferred provider organizations and/or maintenance organizations to determine which plans are most profitable. This module can also be used to track the percentage of net collections in multi-provider practice.

The software may be written in various languages, such as C++. It uses tools and applications such as ODBC to access the provider's database and extract the data, automatic dial-up and ftp to upload data to our server. Transferred data are stored in a database, such as a MySQL database. The database may be on the web server or on a separate remote server. Access to the data is provided by, for example Perl cgi scripts. This web-integrated information is made available to patients on password-protected screens on unique domain web sites that are scalable, configurable, and customizable for each provider and practice type doctor from site templates.

The software integrates with a variety of legacy databases, including Access databases, Unix, and even DOS-based systems.

FIGURE 1 illustrates a system 1 topography useful in the practice of the method and system of the invention. The system shows three web browsers, 11, 13, 15. One browser, 11, is connected

through an internet service provider, 21, to and through the public internet, 23, to a web server, 41. The other two browsers, 13, and 15, one accessible to patients, 13, at the provider's site, and the other, 15, for the individual provider's use at the provider's site, and connected to and through the provider's intranet to the web server, 41. The web server, 41, is a conventional web server, 41, with conventional web server capabilities and functionalities. The web server, 41, is in communication with an application server, 51, which, in turn, is in communication with a database server, 61. The database server, 61, interacts with one or more databases, 71, 73, and 75. At least one of the databases may be a tools repository that has objects and applets specific to the method and system described herein.

While only two office based terminals, 13, and 15, on a LAN or intranet, 25, are shown, it is, of course to be understood the method and system of the invention is amenable to networking multiple offices in the same practice, and uploading data to and through the web or corporate intranet, 25, from a terminal, 13, or server in one location to and through the web or corporate intranet, 25, to the application and web servers and data servers in another location, and to and through the web to a user in another office, as a satellite office. In this way, the method and system facilitates uploading data from a client's server in a main office to a server having the web server, 41, application server, 51, and data server, 61, contemplated herein, and downloading the data to satellite offices.

FIGURE 2 illustrates the interaction of software elements in a scalable module of the method and system of the invention. Central to the illustrated exemplification of the system and method is a database connectivity module, such as the open database connectivity module (ODBC), 111. This is a module for accessing a database. By using the structure and syntax of ODBC, 111, or a similar tool or application, the user can access files in a number of different databases from various vendors, including legacy databases using the same statements in a program,. In addition to the ODBC, 111, software, or a similar functionality, a separate module or driver is needed for each database to be accessed. The main proponent and supplier of ODBC, 111, programming support is Microsoft.

The method and system is described and illustrated with respect to ODBC. This is not meant to preclude the use of programs offering similar functionality, but merely for purposes of illustration and understanding. ODBC is based on and closely aligned with the Open Group standard Structured Query Language (SQL) Call-Level Interface. In this way programs can use SQL requests to access databases without knowing the proprietary interfaces to the databases. ODBC handles the SQL request and converts it into a request the individual database system understands.

The ODBC, 111, or other application, solution, or functionality, provides an interface between one or more databases, shown in FIGURE 2 as the main database and the e-mail database, and the other modules.

One such module, linking the database connectivity module 111, to the outside world and to other modules is the extractor, 121. The extractor, 121, interfaces with the basic database, 131 and performs necessary data extraction and data recording in fit text files. This includes, by way of exemplification, confirming that names of files conform to the names of tables in the associated database. The extractor also performs utility functions such as text file compression and file transfer on FTP to the server and analysis and file transfer of database entries from data sources (patients, referred providers) to the provider. Another function of the extractor is providing high performance CGI using an HTTP connection. The Extractor is a multithreaded Windows dialog based application.

Other aspects of the system are a scheduler, 141, and a data collector or an e-mail collector, 151. The e-mail address collector module, 151, also referred to as a collector module, 151, allows users, as patients or customers, enter their own e-mail addresses, thereby eliminating data entry by staff, reducing likelihood of mis-typed email addresses.

Additionally, the collector, 151, of the method and system of the invention

* Checks the identity of the user using identifying information including birthdate, social security number or other identifying numbers and establishes a perfect match with the individual in the database.

* Keeps Requesting additional information until such a match is established. E.g. prompts for complete spelling of first, last name, birth date, social security number, name of provider, etc.

* Accepts multiple e-mail addresses for a single record, sorts these addresses according to specific parameters. E.g. "Mother" and "Patient". E-mail addresses identified as belonging to "Mother" will receive billing notification, while an e-mail address belonging to an under-18 patient will not.

* In the database, associates e-mail addresses with specific records.

* Assigns and/or accepts user originated personal identification numbers (PINs).

* Allows users to modify, add or delete e-mail addresses.

* Allows users to modify PINs.

While the collector, 151, is illustrated as an e-mail address collector, and is illustrated in the context of a health provider situation, the collector, 151, of the method and system of the invention has applicability beyond its use in patient waiting rooms or patient homes and beyond a patient relationship management system. The collector, 151, can be used as an end-user data collector, e.g., an end user e-mail address collector, in any business situations where there exists a database and a need to gather e-mail addresses and other data for records in that database.

In one embodiment, described herein solely for purposes of exemplification and illustration and not for limitation, there is provided an application called PTInteractive Genie Master. Genie Master is a web-based tool for doctors and other health care providers to manage their patient relationships, including the content of the reminder mails.

FIGURE 3 is a screen shot of a Genie Master settings screen , where the provider, here "Joe Fiddle, DDS" enters his or her data, including name, telephone number, e-mail address, alternative e-mail address, web site URL, and such options and defaults as credit card payment, appointments, recalls, patient payments and charges, insurance payments and charges, birthday greetings.

FIGURE 4 shows an appointment reminder generated by the method and system of the invention, using the system shown in FIGURE 2.

FIGURE 5 shows the setup screen for generating payment overdue notices, while FIGURE 6 shows an actual payment overdue notice issued by the system.

FIGURE 7 shows an example of a recall generated by the method and system of the invention. This would be generated where the system, scanning a practice's recall list, determines that a visit or follow-up visit is necessary, but has not been scheduled. Closely related is the "No show" letter illustrated in FIGURE 8, which is generated by the system when a patient is scheduled for a visit, but misses the appointment.

FIGURE 9 is an example of a Birthday Greeting issued by the system.

Of particular importance in a Web-based patient-provider method and system is system security and data security. This goes beyond merely identification codes and passwords, and encryption, and securesocket layers. What is required is actual access blocking. According to our invention, a file may have a field or fields indicating blocking and access, with an enumeration of classes of users or even individual users who may have access to the record. The "Block/Unblock" option allows the user to restrict access. For example, a provider may have patients who request that their information not be on the Web, or the provider may have cases that the system cannot accurately display on the Web because the data has been entered into the database in a non-standard way. These patients' access can be blocked at this screen.

While the invention has been described with respect to certain preferred embodiments and exemplifications thereof, it is not intended to limit the scope of the invention thereby, but solely by the claims appended hereto.